

Instructions: When faced with a table and lots of text, scan the text looking at the first and last sentences, and browsing for important words and underlining them. When looking at the Table, make sure you examine the variables to see what is being presented. DO NOT spend too much time on any one question. If you don't get it right away, move on. Be sure to ~~CROSS-OUT~~ answers that don't match. Remember, you do NOT need to know ANYTHING about the science topic to do well on the ACT Science section. It is a reading test.

PASSAGE IV

Photosynthesis is a biological process in which light energy is converted to chemical bond energy. This essential process takes place on the primary level of the food chain and provides most of the food energy available to living organisms. Also, photosynthesis is the source for most of the oxygen in Earth's atmosphere. Photosynthesis takes place in two distinctive stages called the "light" reactions and the "dark" reactions.

Light reactions:

These reactions are also known as the photochemical reactions. Plants and some types of microorganisms contain specialized organelles called chloroplasts. In the chloroplasts, light energy is absorbed by the pigment chlorophyll. Some of this energy is used to convert water molecules into hydrogen ions and oxygen gas. The oxygen gas is released into the atmosphere through specialized openings on the plant's leaves. Some of the light energy is used to produce molecules of ATP.

Dark reactions:

These reactions, also called "carbon-fixing" reactions, are not dependent on light. During the dark reactions, the hydrogen ions produced in the light reactions and carbon dioxide from the atmosphere pass through a series of chemical changes to form the simple sugar glucose and other compounds, including water. This glucose can be either consumed immediately or stored for later use. To test the effect of various environmental factors on the process of photosynthesis, a student observed the growth of plants over a period of time. The conditions and the results are described in Table 1. All plants were watered on a regular basis.

Table 1

Plant	Conditions	Results
1	Sunlight	Normal growth Green
2	Darkness	Plant sickly Yellow
3	Sunlight Cut off all the leaves, but left the flowers intact	Plant dead Brown
4	Sunlight Cut off all the flowers, but left the leaves intact	Normal growth Green
5	Sunlight Entire plant covered with plastic wrap	Normal growth Green Condensed water on the plastic wrap

1. Which word equation represents the process of photosynthesis?

F. Sunlight + Carbon Dioxide + Water
→ Glucose + Oxygen + Water

G. Glucose + Sunlight → Alcohol +
Carbon Dioxide

H. Oxygen + Sunlight + Water →
Glucose + Carbon Dioxide + Water

J. Glucose + Sunlight + Oxygen →
Carbon Dioxide + Water

2. According to the passage, oxygen gas is produced in which of the following processes?

- A. Carbon-fixing reactions only
- B. Photochemical reactions only
- C. Chlorophyll-fixing reactions
- D. Both the photochemical and carbon-fixing reactions

3. Which of the following substances undergoes a transformation during the dark reactions of photosynthesis? (Hint: use process of elimination and cross out answers that don't match)

- I. Chlorophyll
 - II. Hydrogen ions
 - III. Carbon dioxide
- F. I only G. III only H. I and III only J. II and III only

4. Which of the plants represents the control for the experiments?

- A. Plant 1 only
- B. Plants 1 and 2 only
- C. All of the plants
- D. None of the plants

5. Which of the following hypotheses is supported by the comparison of changes in Plant 3 and Plant 4?

- F. Chloroplasts are found in leaves but not in flowers.
- G. Chloroplasts are found in flowers but not in leaves
- H. Oxygen is an essential requirement for photosynthesis.
- J. No chemical reactions occur in the stems.